

element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Because *Gupta* fails to teach or disclose at least one claimed step or element, *Gupta* cannot anticipate the claims.

Independent Claim 1

Independent Claim 1, as amended, recites:

A method performed by a first computer node for selecting a leader node to provide service to a plurality of other nodes in a multicast group, wherein each of the nodes communicates using multicast, broadcast or anycast messages, the method comprising the computer-implemented steps of:

- issuing a first election call message;
- receiving candidacy announcement messages from one or more leader candidate nodes in a specified time period;**
- selecting a victor from among all leader candidate nodes from which candidacy announcement messages are received;
- receiving one or more victor announcement messages from one or more leader victor nodes for a second specified time period;
- resolving zero or more collisions among the victor announcement messages to result in selecting the leader node.

(Emphasis added.) Claim 1 provides a method for dynamically and securely electing a leader node to provide service to other nodes in a multicast group. The nodes communicate using multicast, broadcast, or anycast messages during a leader election process. A computer node issues an election call message. It receives **candidacy announcement messages** from leader candidate nodes. It selects a victor among leader candidate nodes. It receives one or more victor announcement message from one or more leader victor nodes. The computer node resolves any collisions among the victor announcement messages. In case of a server failure in a multicast

group, the method beneficially allows services provided by a member server to continue as soon as possible by dynamically and securely electing a new leader server.

Gupta does not disclose candidacy announcement messages

The method of Claim 1 is neither disclosed nor suggested by *Gupta*. *Gupta* does not disclose the sending or receiving of any candidacy announcement messages. *Gupta* teaches a leader election method, conducted in rounds, with each round comprising a filter phase, a relay phase, and a failure detection phase. (Section 3.1; Figure 3.) To initiate the filter phase, a multicast message is sent to all group members. Each group member M_i that receives this message computes a hash using a hash function H . (Section 3.1, Filter Phase, first paragraph.) Next, M_i calculates the filter value $H(M_i A_I) \times N_i$ for the initiating message. (Section 3.1, Filter Phase, first paragraph.) M_i participates in the next phase, called the Relay Phase, **if and only if this filter value is less than constant K** . (Section 3.1, Filter Phase, first paragraph.) In the Relay Phase, a leader is elected. (Section 3.1, Relay phase, fourth paragraph.) This means that any member M_i does not participate in the election phase of the current round unless $H(M_i A_I) \times N_i < K$. In other words, **the candidacy for leader election of a particular member is determined by whether its filter value is less than constant K** .

Each member can see other members in its view. Each member individually calculates $H(M_i A_I) \times N_i < K$ for all other members in its view in order to independently determine whether another member will participate in the Relay Phase, during which one of the participating members will be elected as leader. Thus, each member will individually determine which other members of the group will be participating in the relay round (i.e. be a candidate for leader election) **without sending or receiving any multicast, unicast or other message to each other**.

(Section 3.1, Filter Phase, second paragraph.) Accordingly, *Gupta* has no need to send or receive candidacy messages.

In contrast, Claim 1 discloses **receiving candidacy announcement messages** from one or more leader candidate nodes in a specified time period. Because *Gupta* discloses determining participating members in the relay phase without sending any messages between members, it cannot possibly disclose receiving candidacy announcement messages, as featured in Claim 1.

Because *Gupta* fails to disclose each and every feature as set forth in Claim 1, it is respectfully submitted that Claim 1 is patentable over *Gupta*.

Independent Claims 27, 42, and 57

Independent Claims 27, 42, and 57 include features similar to Independent Claim 1, except in the context of computer-readable media, in means-plus-function form, or as an apparatus claim. It is therefore respectfully submitted that Claims 27, 42, and 57 are patentable over *Gupta* for at least the reasons given above with respect to Claim 1.

Claim 16

The Office action fails to provide a specific reference supporting its rejection for each and every element of Claim 16. Instead, the Office action merely addresses the features of Claim 1. Specifically, the Office action does not provide support for rejecting “the election call messages, candidacy announcement messages, and victor announcement messages are multicast, broadcast or anycast messages.” Thus, the Office action fails to make a *prima facie* case of unpatentability under 35 U.S.C. § 102(b). The Applicants respectfully request that further support be provided and set forth for the rejection of Claim 16.

Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71

The Office action fails to provide a specific references supporting each of its rejections of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71. The Office action merely addresses the features of Independent Claim 1. Thus, the Office action fails to make a *prima facie* case of unpatentability under 35 U.S.C. § 102(b). The Applicants respectfully request that further support be provided and set forth for the rejections of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71.

Additionally, Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 are dependent claims, each of which depend either directly or indirectly from one of independent Claims 1, 16, 27, 42, and 57. Each of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 is therefore allowable for at least the reasons given above with respect to Claims 1, 16, 27, 42, and 57. In addition, each of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 introduces one or more additional features that independently render it patentable. Due to the fundamental differences already identified, to expedite the positive resolution of this case, a separate discussion of the features of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 is not included at this time. The Applicants reserve the right to further point out the differences between the cited art and the novel features in the dependent claims.

B. CLAIMS 2–3, 11–14, 18, 24–25, 28–29, 37–40, 43–44, 52–55, 58–59, AND 67–70—GUPTA IN VIEW OF MILLEN

Claims 2–3, 11–14, 18, 24–25, 28–29, 37–40, 43–44, 52–55, 58–59, and 67–70 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Gupta* in view of a publication, title “CAPSL and MuCAPSL,” published in April 2002 by Jonathan K. Millen (“*Millen*”).

Claims 2, 28, 43, and 58

Claim 2 depends from independent Claim 1, and additionally recites:

“wherein the leader node is a key server that provides keys for use in encrypting multicast group messages.”

The office action relies on *Millen* solely for the above-quoted limitation. However, *Millen* does not “fill the gaps” that *Gupta* leaves with respect to independent Claim 1, as discussed above.

Any combination of *Gupta* with *Millen* fails to provide the complete claimed subject matter of Claim 2. Therefore, it is respectfully submitted that Claim 2 is patentable over *Gupta* in view of *Millen*.

Claims 28, 43, and 58 include features similar to Independent Claim 2, except in the context of computer-readable media, in means-plus-function form, or as an apparatus claim. It is therefore respectfully submitted that Claims 28, 43, and 58 are patentable over *Gupta* in view of *Millen* for at least the reasons given above with respect to Claim 2.

Claims 3, 29, 44, and 59

Claim 3 depends from independent Claim 1, and additionally recites:

“wherein the leader node is a GDOI key server that provides keys to nodes according to Group Domain of Interpretation.”

The office action relies on *Millen* solely for the above-quoted limitation. However, *Millen* does not “fill the gaps” that *Gupta* leaves with respect to independent Claim 1, as discussed above.

Any combination of *Gupta* with *Millen* fails to provide the complete claimed subject matter of Claim 3. Therefore, it is respectfully submitted that Claim 3 is patentable over *Gupta* in view of *Millen*.

Claims 29, 44, and 59 include features similar to Independent Claim 3, except in the context of computer-readable media, in means-plus-function form, or as an apparatus claim. It is
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therefore respectfully submitted that Claims 29, 44, and 59 are patentable over *Gupta* in view of *Millen* for at least the reasons given above with respect to Claim 3.

Claims 11–14, 18, 24–25, 37–40, 52–55, and 67–70

The Office action fails to provide a specific references supporting each of its rejections of Claims 11–14, 18, 24–25, 37–40, 52–55, and 67–70 under 35 U.S.C. § 103(a). The Office action merely addresses the features of dependent Claims 2 and 3 and their derivatives in computer-readable medium, means-plus-function, and apparatus form. The Applicants respectfully request that further support be provided and set forth for the rejections of Claims 11–14, 18, 24–25, 37–40, 52–55, and 67–70.

Additionally, Claims 11–14, 18, 24–25, 37–40, 52–55, and 67–70 are dependent claims, each of which depend either directly or indirectly from one of independent Claims 1, 16, 27, 42, and 57. Each of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 is therefore allowable for at least the reasons given above with respect to Claims 1, 16, 27, 42, and 57. In addition, each of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 introduces one or more additional features that independently render it patentable. Due to the fundamental differences already identified, to expedite the positive resolution of this case, a separate discussion of the features of Claims 4–9, 15, 19–23, 26, 30–35, 41, 45–50, 56, 60–65 and 71 is not included at this time. The Applicants reserve the right to further point out the differences between the cited art and the novel features in the dependent claims.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,

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Dated: May 10, 2007



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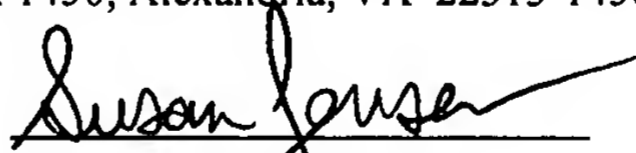
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by


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